ADEQ Arizona Department of Environmental Quality

Initial Distribution System Evaluation (IDSE) Report
for System Specific Study (SSS) Using a
Distribution System Hydraulic Model
Stage 2 Disinfectants and Disinfection Byproducts Rule

I. GENERAL INFORMATION

A. System Information*

B. Date Submitted*

PWS ID#: AZ04_____ _____
PWS Name: _____
Street Address: _____
City: _____
State: _____
Zip: _____

Population Served: _____

Source Water Type: ___Ground ___Surface/GUDI
System Type: ___CWS ___NTNCWS
Combined Distribution System: ___Wholesale ___Consecutive ___Neither

C. PWS Operations

Residual Disinfectant Type: ___Chlorine ___Chloramines ___Other_____
Number of Disinfected Sources: _____Surface _____GUDI _____Ground _____Purchased

D. Contact Person*

Name: _____
Title: _____
Phone Number: _____ Fax Number (if applicable): _____
Email Address (if applicable): _____

II. SSS AND STAGE 2 DBPR REQUIREMENTS*

A. Number of Required Stage 2 DBPR Compliance Monitoring Sites _____ TOTAL

Highest TTHM: _____ Stage 1 DBPR: _____
Highest HAA5: _____

B. IDSE Schedule: ___Schedule 1 ___Schedule 2 ___Schedule 3 ___Schedule 4

C. Stage 2 DBPR Compliance Monitoring Frequency

___ Once during peak historical month
___ Every 90 days (4 monitoring periods)

D. Number of Required SSS Samples _____ TOTAL

III. MODELING INFORMATION *(Skip this section if you submitted a modeling study plan with an approved model calibration and you information has not changed)*

A. How was demand data assigned to the model? (attach additional sheets if needed)

1. What method was used to assign demands throughout the system?

_____
_____
_____
_____

2. How did you estimate diurnal demand variation? How did you determine total system demand?

_____
_____
_____
_____

3. How many demand categories did you use?

_____
_____
_____
_____

4. How did you address large water users?

_____
_____
_____
_____

B. Describe all calibration activities undertaken* (attach additional sheets if needed)

1. When was the model last calibrated?

_____
_____
_____
_____

2. What types of data were used in the calibration?

3. When was the calibration data collected?

4. What field tests have been performed to collect calibration data?

5. How did you determine friction factors (C-factors)?

6. Was the calibration completed for the peak month for TTHM formation? If not, was the model performance verified for the peak month for TTHM formation?

7. How well do actual tank levels correlate with predicted tank levels during the peak month for TTHM formation? **Submit a graph of predicted tank levels vs. measured tank levels for the storage facility with the highest water age in each pressure zone.***

8. If you are using a water quality model, what parameters are modeled? How was the model calibrated?

_____
_____
_____
_____

C. How was the SSS modeling performed?* (attached additional sheets if needed)

1. Was modeling done for the operating conditions during the peak month for TTHM formation*?

_____
_____
_____
_____

2. How were operational controls represented in the model?

_____
_____
_____
_____

3. How was water age simulated during the peak month for TTHM formation (time steps, length of simulation, etc.)?

_____
_____
_____
_____

4. What are the average water age results for your distribution system? **Submit final model output showing 24-hour average residence time throughout the distribution system*. Submit graph of water age at the longest residence time storage facility in the distribution system showing the predictions for the entire EPS simulation period*.**

_____
_____
_____
_____

IV. SSS MONITORING LOCATION SELECTION

How were the SSS monitoring locations selected? (attach additional sheets if needed)

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1. What model results were used as the basis for selection?

2. What criteria were used in selecting average residence time, high TTHM, and high HAA5 sites?

3. What additional data was used in the analysis, and how was it used?

4. How did you look at practical considerations like accessibility of sampling locations?

5. How did you verify that your selected sampling locations corresponded to the selected node in your model?

V. SSS AND STAGE 1 DBPR COMPLIANCE MONITORING RESULTS*

A. TTHM Results (attach additional sheets if needed for SSS and Stage 1 DBPR results)

Site ID & Category	Data Type	TTHM (mg/L)				LRAA[1]
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					

[1] LRAA = Locational Running Annual Average

B. HAA5 Results (Attach additional sheets if needed for SSS and Stage 1 DBPR results)

Site ID & Category	Data Type	HAA5 (mg/L)				LRAA[1]
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					
	Sample Date					
	Sample Result					

[1] LRAA = Locational Running Annual Average

C. Where were your TTHM and HAA5 samples analyzed?

___ In-House
Is your in-house laboratory certified? ___Yes ___No
___ Certified Laboratory
Name of certified laboratory: _____

D. What method(s) was used to analyze your TTHM and HAA5 samples?

TTHM	HAA5
___ EPA 502.2	___ EPA 552.1
___ EPA 524.3	___ EPA 552.2
___ EPA 551.1	___ EPA 552.3
	___ SM 6251 B

VI. SELECTION OF STAGE 2 DBPR COMPLIANCE MONITORING LOCATIONS

Describe the comparison of sampling and modeling results (attach additional sheets if needed):

1. How well did the sampling results correspond to the modeling results?

_____
_____
_____
_____

2. For samples that did not match well with model results, what follow-up investigations were performed?

_____
_____
_____
_____

3. Were additional samples collected? (Include data on table in Section IV)

_____
_____
_____
_____

4. **Submit a graph of water age versus time for each selected sampling location*.**

_____
_____
_____
_____

VII. JUSTIFICATION OF STAGE 2 DBPR COMPLIANCE MONITORING SITES* (attach additional sheets if needed)

Stage 2 Compliance Monitoring Site ID	Site Type	Justification
	___ Highest TTHM ___ Highest HAA5 ___ Stage 1 DBPR	
	___ Highest TTHM ___ Highest HAA5 ___ Stage 1 DBPR	
	___ Highest TTHM ___ Highest HAA5 ___ Stage 1 DBPR	
	___ Highest TTHM ___ Highest HAA5 ___ Stage 1 DBPR	
	___ Highest TTHM ___ Highest HAA5 ___ Stage 1 DBPR	
	___ Highest TTHM ___ Highest HAA5 ___ Stage 1 DBPR	
	___ Highest TTHM ___ Highest HAA5 ___ Stage 1 DBPR	
	___ Highest TTHM ___ Highest HAA5 ___ Stage 1 DBPR	

VIII. PEAK HISTORICAL MONTH*

A. Peak Historical Month* ____________________

B. Is your Peak Historical Month the Same as Your Peak Month in Your Modeling Study Plan?

___ Yes ___ No

If no, explain how you selected your new peak historical month (attach additional sheets if needed):

_____
_____
_____
_____

IX. PROPOSED STAGE 2 COMPLIANCE MONITORING SCHEDULE* (Attached additional sheets if needed)

Stage 2 Compliance Monitoring Site ID	Projected Sampling Data (date or week)[1]			
	Period 1	Period 2	Period 3	Period 4

[1]period = monitoring period. Complete for the number of monitoring periods from Section II.C.

X. DISTRIBUTION SYSTEM SCHEMATIC*

Attach a schematic of your distribution system. If your schematic has changed or if you did not show your SSS monitoring locations on the distribution system schematic you submitted with your model study plan, you must submit a revised distribution system schematic.

XI. ATTACHMENTS

___ Tabular or spreadsheet documentation that your model meets minimum calibration requirements If updated since approved modeling study plan* (Section III).

___ Additional sheets for explaining model information/results, including required graphs if not submitted as part of an approved modeling study plan* (Section III)

___ Additional sheets for sampling results, if needed (Section V).

___ Additional sheets for selection of Stage 2 DBPR compliance monitoring sites (Section VI).

___ Graph of water age versus time for all Stage 2 DBPR sites selected* (Section VI).

___ Additional sheets for justification of Stage 2 DBPR Compliance Monitoring Sites, if needed (Section VII).

___ Additional sheets for explaining how you selected the peak historical month (Section VIII).

___ Additional sheets for proposed compliance monitoring schedule (Section IX).

___ Explanation of deviations from approved study plan.

___ Distribution system schematic*(Section X). **Required if it has changed from your approved model study plan or if monitoring locations were not shown.**

___ Compliance calculation procedures (for Stage 2 Compliance Monitoring Plan).

Total number of pages in your IDSE report: _____

Note: Fields with an asterisk (*) are required by the Stage 2 DBPR.

Please submit IDSE Report for SSS Using a Distribution System Hydraulic Model to:

Arizona Department of Environmental Quality
Attn: Starr Abounader
Drinking Water Monitoring and Protection Unit, Mail Code 5415B-2
1110 West Washington Street
Phoenix, AZ 85007

If your public water system is in Maricopa County, you must <u>also</u> submit your SSS Report to:

Maricopa County Environmental Services Department
Attn: John Kolman
Drinking Water Program
1001 North Central Avenue, Suite 250
Phoenix, AZ 85004

INSTRUCTIONS FOR COMPLETING THE FORM

I. General Information

I.A. PWS ID – Enter your public water system identification number here.

PWS name – Enter the name of your system here.

PWS Address – Enter the primary mailing address for you water system here.

Population served – Enter the number of people served by your PWS. This is your retail population served, not including the population served by consecutive systems that purchase water from you.

Source Water Type – Put a check mark to identify whether your system is a subpart H (surface water/ GUDI) system or a groundwater system. If you use any surface water or GUDI as a source, put a check mark next to surface/GUDI.

System Type – Put a check mark to identify whether your system is a community water system (CWS) or nontransient noncommunity water system (NTNCWS).

Buying/Selling Relationships – Put a check mark to identify whether your system is a wholesale system, consecutive system, or neither. If you are both a consecutive and wholesale system (e.g., you buy and sell water), check both.

I.B. Date Submitted – Enter either the date that you are submitting the form electronically, putting it in the mailbox, or dropping it off with the express delivery service. Be sure to submit your SSS plan before the deadline.

I.C. Residual Disinfectant Type – Put a check mark to identify the type of disinfectant you most often use **to maintain a residual in your distribution system** (not necessarily the same disinfectant used for primary disinfection at the treatment plant). If you use chloramines but switch to free chlorine for a short time, you should still check chloramines only. If you use chloramines and chlorine regularly in your system (e.g., 4 months of free chlorine and 8 months of chloramines), check both chlorine and chloramines. If you maintain your residual with a disinfectant other than chlorine or chloramines (e.g., chlorine dioxide), you should place a check next to “Other” and enter the type of disinfectant you use in the blank next to “Other”.

Number of Disinfected Sources – Enter the total number of sources that deliver disinfected water to your distribution system. If you connect to a single wholesale system at a number of locations in your distribution system, consider this one purchased source. Multiple wells that are disinfected at a common treatment plant should also be considered one source. Do not count wells that are not disinfected or are

disinfected by UV only.

I.D. Contact Person – Enter the contact information of the person who is submitting the form. This should be the person who will be available to answer questions from state reviewers.

II. SSS and Stage2 DBPR Requirements*

II.A. Number of Required Stage 2 DBPR Compliance Monitoring Sites – Refer to the ***System Specific Study Requirements – Attachment*** in Chapter 2 of the IDSE guidance manual. Copy the numbers from the table that correspond to your source water type and the population served by your system.

II.B. IDSE Schedule – Enter the schedule for your system based on the letter sent to you from ADEQ. You can also refer to Exhibit 2.1 of the IDSE Guidance Manual (page 2-2) to determine your IDSE schedule number.

II.C. Stage 2 DBPR Compliance Monitoring Frequency – Refer to the ***System Specific Study Requirements – Attachment*** in Chapter 2 of the IDSE guidance manual. From the "Stage 2 Compliance Monitoring Requirements" table, locate the monitoring frequency that corresponds to your source water type and the population served by your system. Put a check mark corresponding to that monitoring frequency.

II.D. Number of Required SSS Samples – Enter the number of samples you were required to collect during the peak month for TTHM formation.

III. Modeling Information

Systems with an approved model calibration as part of their modeling study plan do not need to complete this Section. If any of your information submitted as part of the modeling study plan has changed, provide updated Information in this section.

III.A. How was demand data assigned to the model? – For each question, provide a brief description of the data and methods used to assign customer demands to the model.

III.B. Describe all calibration activities undertaken.* – For each question, provide a brief description of the data and methods used to calibrate your model.

If you did not complete calibration prior to your study plan submittal or if your calibration has changed, submit a graph that documents your model calibration by showing simulated tank levels versus observed levels for the storage facility with the highest water age in each pressure zone of your system (see Exhibit 6.5 in the IDSE guidance manual for an example)*.

Systems with an approved model calibration as part of their modeling study plan do not need to complete this section.

III.C. How was the SSS modeling performed?*

Systems with an approved model analysis as part of their modeling study plan do not need to complete this section unless their information has changed.

Systems who conducted their water age modeling analysis after submitting their modeling study plan should answer all questions.

- **Submit model output showing final average water age results over a 24-hour period***. The 24-hour period used for the average water age results table should represent a simulation time after the model has achieved a stable, repeating water age pattern (e.g. the last 24 hours of the simulation). ADEQ recommends that you submit this in tabular format to not pose a security risk to your system.
- **Submit a graph of water age versus time for the entire simulation duration for the tank with the highest overall water age in the system***.

IV. SSS Monitoring Location Selection

Provide an explanation of the approach used to analyze water age results to select SSS monitoring locations. Describe how sites were ranked for water age (e.g. percentile, highest to lowest, etc.). Include any additional data that was used to assist in the analyses, such as accessibility, coverage of geographic areas, or coverage of hydraulic zones that factored into the decision.

V. SSS and Stage 1 DBPR Compliance Monitoring Results*

V.A. TTHM Results – Enter the TTHM results for each monitoring site for each monitoring period in which you collected data. For each sample result, enter the date on which sampling was conducted. You should enter all SSS monitoring results as well as all Stage 1 DBPR compliance monitoring results collected during the IDSE period. If you collected samples during a single monitoring period, your LRAAs for those sites will be the same as the monitoring results. For each site ID, identify the location type (High TTHM, High HAA5, Average, Entry Point).

V.B. HAA5 Results – Enter the HAA5 results for each monitoring site for each monitoring period in which you collected data. For each sample result, enter the date on which sampling was conducted. You should enter all SSS monitoring results as well as all Stage 1 DBPR compliance monitoring results collected during the IDSE period. If you collected samples during a single monitoring period, your LRAAs for those sites will be the same as the monitoring results. For each site ID, identify the location type (High TTHM, High HAA5, Average, Entry Point).

V.C. Where were your TTHM and HAA5 samples analyzed? – Put a check mark to identify whether your system analyzed TTHM and HAA5 samples in an in-house laboratory or sent the samples to a certified laboratory for analysis.

If you analyzed your TTHM and HAA5 samples in an in-house laboratory, put a check mark to identify whether your laboratory is certified. If you sent your TTHM and HAA5 samples to a certified laboratory, enter the name of the laboratory in the space provided. If you used more than one laboratory (e.g., if you used different laboratories for SSS samples and Stage 1 DBPR compliance samples), list both laboratories, or check "in-house" and list the name of the laboratory if applicable.

V.D. What method(s) was used to analyze your TTHM and HAA5 samples? – Put a check mark to indicate the analytical method used to measure the TTHM and HAA5 concentrations of your SSS and Stage 1 DBPR compliance samples. If more than one method was used (e.g., if you used different laboratories for SSS samples and Stage 1 DBPR compliance samples), check more than one method. If you do not know what method was used, contact your laboratory.

VI. Selection of Stage 2 DBPR Compliance Monitoring Locations

Describe the comparison of sampling and modeling results. Provide a description of the comparison between sampling and modeling results, including any follow-up investigations done to resolve discrepancies. See Section 6.3.3 of the IDSE guidance manual for more information.

You must submit a graph of water age versus time for each site selected*. You should show the selected sites on the distribution system schematic and assign each site a unique site ID (see Section XI). For security reasons, the graphs of water age for each selected Stage 2 compliance monitoring site should not be identified by site location number. A blind numbering system should be used on each graph, which you can discuss with ADEQ if they contact you with questions about your IDSE report.

VII. Justification of Stage 2 DBPR Compliance Monitoring Sites*

Enter the site ID from the distribution schematic and the site category (highest TTHM, highest HAA5, or Stage 1 DBPR). You must provide a justification for each site including the modeling and sampling results that led you to select it. See Section 6.4.4 of the IDSE guidance manual for guidance. For example, a justification for a highest HAA5 site might be:

High average water age, high HAA5 results during monitoring, measurable residual in historical TCR data, located in East Pressure Zone

Note that there is only space for 8 monitoring sites on this sheet. If you need more space, attach additional sheets.

VIII. Peak Historical Month

VIII.A. Peak Historical Month for TTHM and HAA5* – Enter the month that you determined to be your peak historical month for TTHM and HAA5.

VIII.B. Is your Peak Historical Month the Same as Your Peak Month for TTHM Formation in Your Modeling Study Plan? – Put a check mark to identify whether your system is using the same peak. If your SSS monitoring results or other factors prompted you to select a different peak month, explain how you selected a new peak month. Note that the modeling SSS was based on using the peak month for TTHM formation for the modeling analysis. However, compliance with Stage 2 DBPR is based on the peak historical month for TTHM and HAA5. You should use the same peak historical month that you used for your SSS monitoring unless you have convincing data to do otherwise.

IX. Proposed Stage 2 DBPR Compliance Monitoring Schedule*

Enter the ID for each Stage 2 DBPR compliance monitoring site in the table (these should match the ID's you enter in Section VII and on your schematic). Enter your proposed sampling schedule for the number of monitoring periods identified in Section II.C. The entry can be a specific data or week and can in a number of different formats. For example:

- 7/9/07
- 2nd week in Nov '07
- Week of 7/9/07

Remember that at least one monitoring period must be during the peak historical month identified in Section VIII.A. Note that there is only space for 8 monitoring sites on this sheet. If you are a subpart H system serving more than 249,999 people you are required to monitor at more than 8 sites. Therefore, you will need to attach additional sheets.

X. Distribution System Schematic*

A distribution system schematic is required *only if it has changed from your approved modeling study plan*. If it has changed, you must attach a distribution system schematic. **If you did not show your SSS monitoring locations on the distribution system schematic you submitted with your modeling study plan, you must submit a revised distribution system schematic.** See Section 6.4 of the IDSE guidance manual for guidance.

XI. Attachments

Put a check mark to identify any attachments you have included in your report.

Note that some of the attachments are required by rule.

If you deviated from your approved study plan, you must attach an explanation of all deviations.

Enter the total number of pages in your IDSE report (including attachments) in the space provided. This will allow ADEQ to ensure that all pages were received.